

In the Specification:

On page 1 before the first paragraph, please delete the following:

Description

Please amend the title as follows:

a1
**METHOD FOR INTERIOR-SPACE/EXTERIOR-SPACE DETECTION OF A
RESPONSE TRANSMITTER WHICH COMMUNICATES IN WIRE-FREE FASHION
WITH A BASE STATION, AND A COMMUNICATIONS SYSTEM**

On page 1 before the first paragraph, has been amended to include the following insert: ✓

a2
CLAIM FOR PRIORITY

This application claims priority to German Application No. 100 24 852.7 which was filed
in the German language on May 19, 2000.

TECHNICAL FIELD OF THE INVENTION

✓
Please replace the paragraph beginning on line 6 of page 1 with the following rewritten
paragraph:

a3
The invention relates to a method for interior/exterior-space detection of a response
transmitter which, and in particular, to a method which communicates in a wireless manner with
a base station and a communications system.

On page 1, between lines 5 and 6 has been amended to include the following heading: ✓

a4
BACKGROUND OF THE INVENTION

↑

Between 5 - 6

✓
Please replace the paragraph beginning on line 10 of page 1 with the following rewritten paragraph:

9⁵ Communications systems having a base station including a transmitter/receiver unit, and a response transmitter which, with a signal containing an item of code information, transmits a response signal in response to an interrogation signal, which response signal is received by the base station and evaluated with respect to the code information in order to identify the response transmitter, are well known.

✓
Please replace the paragraph beginning on line 18 of page 1 with the following rewritten paragraph:

9⁶ EP 0 153 613 B1 discloses a response transmitter that contains a strip of magnetostrictive, ferromagnetic material which resonates mechanically at a preselected frequency within a frequency band. This response-transmitter specific resonance is detected by the base station as code information, such that when the code information corresponds to a previously stored code information item, an access system, for example, is enabled. This type of communications system is advantageous because carrying the response transmitter is sufficient to provide proof of the person's access authorization. In the keyless access system disclosed in EP 0 153 613 B1 and which is used, for example, in a motor vehicle, interrogation zones are defined by connecting transmitter/receiver antennas to the base station, the antennas being arranged at predetermined points on the vehicle. For example, it may be arranged in the vicinity of the driver's door and front seat passenger's door and used to emit short-range interrogation signals, to whose reception the response transmitter responds. It is also possible to arrange such an antenna within the trunk so that it is detected if the response transmitter has been left in the trunk. Given a positive detection by the trunk, for example, it is automatically prevented from being locked. The known keyless access system includes additional proximity sensors so that it is activated to emit an interrogation signal only if a person approaches a proximity sensor, for example.

Please replace the paragraph beginning on line 12 of page ²1 with the following rewritten paragraph:

(A/E) Another advantage of such a communications system includes detecting whether the response transmitter is located inside or outside a space, in which case the communication between base station and response transmitter will be maintained irrespective of the location of the response transmitter, provided that the response transmitter is located in the transmitter range of the base station. In this way, it is possible to carry out enabling measures or control measures which depend on the location of the response transmitter or of a person carrying the response transmitter, for example, special authorizations for carrying out safety-relevant functions, as soon as it is ensured that the response transmitter is located in an interior space.

On page 2, between lines 26 and 27 has been amended to include the following heading:

SUMMARY OF THE INVENTION

A8 In one embodiment of the invention, there is a method for detection of a response transmitter which communicates with a base station. The method includes, for example, communicating using two frequency ranges between the base station and the response transmitter, the space being permeable to a first frequency range and impermeable to a second frequency range.

In one aspect of the invention, the communication from the response transmitter to the base station occurring in the first frequency range.

In another aspect of the invention, the base station transmitting a communication signal in the first frequency range and a location interrogation signal in the second frequency range.

In still another aspect of the invention, the base station transmitting location interrogation signals selectively from one of inside and outside the space.

In yet another aspect of the invention, the response transmitter being activated using the location interrogation signal.

In another embodiment of the invention, there is a communications system. The system includes, for example, a base station with a first transmitter/receiver unit for communication signals and a transmitter unit for location interrogation signals, a response transmitter with a second transmitter/receiver unit for the communication signals and a receiver unit for location interrogation signals; and an interior space having walls impermeable to one frequency range, the communication signals being transmitted and received in a frequency range to which the walls are permeable and the location interrogation signals being transmitted in a frequency range to which the walls are impermeable.

In one aspect of the invention, the base station having a transmitter antenna located outside of the interior space and a transmitter antenna located inside of the interior space. In another aspect of the invention, the response transmitter including code data which is transmitted collectively in response to the communications interrogation signal.

AS In still another aspect of the invention, the communications system being a component of an anti-theft system of a motor vehicle, the base station being in a motor vehicle and the response transmitter being carried by a person.

In yet another aspect of the invention, the response transmitter being activated using the location interrogation signal.

In another aspect of the invention, the response transmitter including code data which is transmitted collectively in response to the communications interrogation signal.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is explained in more detail below by way of example and with reference to schematic drawings, in which:

Fig. 1 shows a block circuit diagram of a communications system according to the invention.

Fig. 2 shows a flowchart explaining the method of operation of the communications system.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

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Please replace the paragraph beginning on line 28 of page 2 with the following rewritten paragraph:

A9
The invention discloses implementing, in a communications system with at least one base station and at least one response transmitter, detecting whether a response transmitter is located inside or outside a space.

↓
Please delete lines 33-34 on page 2.

Please replace the paragraph beginning on line 35 of page 2 with the following rewritten paragraph:

A10
An interior space is, for example, a space which is enclosed by electrical conductors. Such a space can be a space within a building, for example a space which is critical for safety, or the interior of a motor vehicle, etc. Depending on the construction of the electrical conductors, electromagnetic waves above a predetermined frequency are allowed to pass through, without attenuation, through the walls into the interior space. On the other hand, at large wavelengths or very low frequencies, the incoming waves or fields are not let through the walls owing to the influence of the electrical conductors. Communication between the base station and the response transmitter in a frequency range which is let through by the walls can thus be carried out irrespective of whether the base station and the response transmitter are located inside or outside the interior space. On the other hand, communication in a frequency range to which the walls are impermeable can take place only if the base station and the response transmitter are located on the same side of the walls of the interior space. By making expedient use of both frequency ranges for the communication it is thus possible for the response transmitter and the base station

cont
A¹⁰
to communicate with one another continuously, but it is still possible to determine whether they are located on different sides of the walls of an interior space.

complete
↓
Please delete lines 27-34 of page 3.

Please replace the paragraph beginning on line 35 of page 3 with the following rewritten paragraph:

A¹¹
In one embodiment, the communications system is suitable in particular for use within anti-theft system or access control-system of a motor vehicle.

↓
Please delete lines 1-11 of page 4.

↓
Please replace the paragraph beginning on line 12 of page 4 with the following rewritten paragraph:

A¹²
According to fig. 1, an interior space 2 is surrounded by walls 4 (which are indicated by dashed lines and which include electrical conductors 6), for example in the form of a lattice or in the form of flat components, as in the example of a motor vehicle.

↓
Please replace the paragraph beginning on line 27 of page 4 with the following rewritten paragraph:

A¹³
The base station 8 includes further units (not illustrated) for generating the transmitted signals and for evaluating the received signals, as well as a control unit, preferably provided with a microprocessor, for controlling the operation.

✓
Please replace the paragraph beginning on line 32 of page 4 with the following rewritten paragraph:

Q¹⁴ The design and function of the individual elements or modules of the base unit are known and therefore not explained.

✓
Please replace the paragraph beginning on line 4 of page 5 with the following rewritten paragraph:

Q¹⁵ In a way similar to the base station 8, the response transmitter 20 includes assemblies for generating these transmission/reception signals, for storing code information, for evaluating the received signals and for controlling the entire operation, and the design of said assemblies is known and is therefore not explained. The basic design of the response transmitter 20 can be similar, with the exception of the additionally provided receiver unit 26, to that of the data carrier, known, or response transmitter of keyless access control systems of motor vehicles.

✓
Please replace the paragraph beginning on line 16 of page 5 with the following rewritten paragraph:

Q¹⁶ For the walls 4 of the interior space 2 there is a critical wavelength γ_c which is dependent on the distance between the electrical conductors 6 and above which electromagnetic waves do not penetrate the walls owing to the shielding effect of the electrical conductors 6. For the wavelengths γ_c which are used in communication signals, and for the wavelengths γ_o which are used for local interrogation signals, the following applies: $\gamma_k < \gamma_c < \gamma_o$. Accordingly, the operating range of a local interrogation signal or local detection signal is restricted to the region outside or inside the interior space 2 depending on whether the transmissions occur outside or inside the interior space, while the operating range of the communication signals covers the exterior and the interior space. The power with which the communication signals are transmitted, and the sensitivity of the associated receiving devices, are advantageously selected in such a way that the operating range is greater than the external dimensions of the interior

conf
A¹⁶
space 2 and smaller than the operating range of a local interrogation signal. In fig. 1, a communication signal 30 is represented throughout as a bidirectional signal. A local interrogation signal 32 is represented as a unidirectional signal by dashed lines.

✓
Please replace the paragraph beginning on line 11 of page 6 with the following rewritten paragraph:

A¹⁷
It will be assumed that the base station 2 outputs a communications interrogation signal KAFS periodically or controlled as a function of events, in this example. If one of a plurality of possible response transmitters is located in the operating range of the base station 2 or inside its transmitting range, this response transmitter responds in step 42 with a communications response signal KATS which includes its identifier. This response signal KATS is received by the base station 8 in step 44 and the identifier is checked in 46. Given a check with a positive result (48), the system knows that there is an authorized response transmitter located in its area.

✓
Please replace the paragraph beginning on line 24 of page 6 with the following rewritten paragraph:

A¹⁸
In order to initiate a specific action, the system must know whether the response transmitter, or a response transmitter, is located inside or outside the interior space 2. For example, the vehicle is allowed to be locked if a response transmitter is located outside the interior space, or the motor is allowed to be started if a response transmitter is located inside the interior space etc. It will be assumed in the present example that in 50 it is determined that a local detection is necessary because it has to be detected, for example for a locking operation, whether a response transmitter is located outside the interior space or the vehicle. The base station 2 then transmits, in 52, a communication signal AK with the content that a location interrogation signal is transmitted at a time t_1 . The response transmitter activates, in 54 at the time t_1 , its receiver unit 26 for the reception of the local interrogation signal. At the time t_1 , the base station 8 transmits the local interrogation signal OAFS via the antenna 18 located outside

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Q¹⁸
the interior space 2. After the time t_1 , the response transmitter 20 informs the base station 8, in a communications response signal in 60, whether or not it has received the local interrogation signal in 58.

✓
Please replace the paragraph beginning on line 12 of page 7 with the following rewritten paragraph:

Q¹⁹
If the local interrogation signal OAFS has been received in 58, it is possible to conclude that the response transmitter 2 is located outside the interior space 2 and the vehicle can be locked (62, 64).

✓
Please replace the paragraph beginning on line 17 of page 7 with the following rewritten paragraph:

Q²⁰
If no local interrogation signal was received, it may be expedient to make additional positive checks as to whether the response transmitter is located in the interior of the vehicle in order to make sure that the non-reception of the local interrogation signal is not due to an error in the response transmitter. To do this, 72 to 84 which are similar to 52 to 64 are run, with the single difference that the local interrogation signal OAFS is transmitted by the antenna 16 located within the interior space 2 at a time t_2 . This time is transmitted to the response transmitter 20, as described above, by a communication signal in 72. The response transmitter then switches its receiver unit 26 to the active state in 74 at the time t^2 . The response transmitter 20 subsequently informs the base station 8, in 80, whether or not the response interrogation signal has been received.

✓
Please replace the paragraph beginning on line 35 of page 7 with the following rewritten paragraph:

921 If the response transmitter 20 has not received a local interrogation signal at the time t_1 and has received a local interrogation signal at the time t_2 , it is reliably determined that the response transmitter is located inside the interior 2 (84).

✓
Please replace the paragraph beginning on line 3 of page 8 with the following rewritten paragraph:

922 The time period between t_1 and t_2 is advantageously selected to be small in order to ensure that the position of the response transmitter has changed slightly during the interrogations.

✓
Please replace the paragraph beginning on line 19 of page 8 with the following rewritten paragraph:

923 The base station and/or the response transmitter may be designed in such a way that in each case the reception of a local interrogation signal which is transmitted in the frequency range to which the walls are impermeable automatically triggers a response signal which is transmitted in the other frequency range. In this way, that part of the bidirectional communication which otherwise takes place exclusively in the frequency range to which the wall 4 is permeable and triggers an activity of a part (data carrier or base station) which receives a local interrogation signal, takes place by the local interrogation signal which is used unidirectionally.

✓
Please replace the paragraph beginning on line 11 of page 9 with the following rewritten paragraph:

924 The fact that the bidirectional communication takes place at the higher frequency meets the need to operate with a high Baud rate on the communications channel. on the other hand, by the lower frequency local interrogation signal it is possible to operate with a high field strength so that the local interrogation signal can be used, for example, to activate or wake up the signal